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STANFORD UNIVERSITY SCHOOL OF MEDICINE
Department of Genetics
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Mr. Bob Spitzka
State Solid Waste Management Board
1416 9th Street
Sacramento, California 95814

Dear Mr. Spitzka,

I was most interested to hear from you about studies on the use of composting to prepare municipal wastes and sludge for landfill operations on the delta.

As I mentioned to you over the phone, Dr. Goluecke is certainly one of the world's experts on this technology. But as he also cautioned you, existing knowledge on the survival of virus pathogens is very flimsy. In fact I am impressed that the scientific foundations of sanitary management are in general remarkably feeble in relation to their enormous public health implications. Having been around longer than scientific medicine, it is understandable that we may have been content with a mainly empirical basis for our management practices but I am sure we are going to have some disasters if we do not attempt a fresh look at these problems. As far as I can tell, we really do not understand even the basic mechanisms of bacterial disinfection in the course of traditional treatment practices, not to mention what happens to important viruses.

In particular I think it may be necessary to caution that the usual methods of assaying for infectivity of surviving virus particles may not cover the whole story since the genetic information of an inactive particle may still be available in more complex biological interactions with other widely occurring natural viruses. This point has hardly been considered at all in scrutinizing the hygienic implications of waste disposal - and I have to add may be of equal importance in vaccination programs and in other contexts in which viruses are going to be widely applied.

I mention this just to illustrate the complexity of some of these problems and I realize that this may not accord with the level of analysis that you are interested in at the present time.

The one person in this country who has made a life work of concern about viral hazards in water supplies is Dr. Gerald Berg at the National Environmental Research Center, EPA, Cincinnati, Ohio. I think you could do a little better than contact him directly. In addition I have in hand a brief review of recent literature "Viruses in Waste, Rennovated, and Other Waters": EPA - 670/9-75-007, which you should be able to get hold of readily through

EPA channels.

Some other relevant publications are Public Health Service Publication No. 1936: "Composting Dewatered Sewage Sludge"; "Composting of Municipal Solid Wastes in the U.S.", EPA SW-47R; "Landfill Disposal of Hazardous Wastes : a review of literature and known approaches", EPA/530/SW 165.

And I think you already know Charlie Bourns in San Francisco who may be able to facilitate getting other EPA material for you on this general subject. The EPA has an excellent information retrieval system that may be geared very directly to your requirements.

There is also a sophisticated WHO international reference center for wastes disposal at Dübendorf, Switzerland, which I would also indicate as a valuable resource.

Finally, I am enclosing copies of the two most recent publications that I have been able to find in the scientific periodical literature that bear directly on the question of survival of human pathogens after composting. If nothing else, they may help to show you where active research is continuing on these problems of disinfection.

I strongly share Dr. Goluecke's concern that this approach to the ultimate disposal (as opposed to transportation) of biologically hazardous wastes be given the most critical consideration. If I can be of any further help in the design of constructive critical experiments, I would be happy to do so.

Sincerely yours,

Joshua Lederberg
Professor of Genetics

JL/rr
Enclosures

(1) Savage, Jacob, Theodore Chase, Jr. and James Macmillan, "Population changes in enteric bacteria and other microorganisms during aerobic thermophilic window composting", Appl.Microbiol. 26:969-974, 1973.

(2) Wiley, B. Beauford and Stephen C. Westerberg, "Survival of human pathogens in composted sewage", Applied Microbiol. 18:994-1001, 1969.

P.S. Bob Cooper of the Department of Public Health at Berkeley is another resource I would urge you to contact. I have been working with him recently on a very comprehensive study of problems on waste water reclamation and I think he has an excellent grasp of the related literature.